AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method of determining the presence of a target agent in an environment, comprising the steps of:

obtaining a first sample from the environment;

introducing the first sample to at least one detection module;

filtering the first sample through at least a first filter and a second filter ~~comprising~~ which are part of the at least one detection module, wherein the first filter and the second filter ~~are~~ comprise porous Bragg gratings, further wherein the first filter contains at least one detection molecule for binding the target agent thereto and the second filter contains no detection molecules for binding the target agent thereto;

measuring an optical property of the first filter and the second filter after filtering the first sample there through; [[and]]

comparing the measured optical property of the first filter to the measured optical property of the second filter to determine [[the]]a presence of the target agent;

measuring an optical property of a third filter which is not exposed to the first sample, the third filter comprising a porous Bragg grating; and

comparing the measured optical property of the third filter to the measured optical property of the first and second filters to determine a presence of spurious signals caused by the environment.

2. (Cancelled)

3. (Cancelled)

4. (Previously Presented) The method of claim 1, wherein the Bragg gratings are formed by holographically polymerizing a polymer-dispersed liquid crystal material.

5. (Original) The method of claim 4, wherein the Bragg grating is fabricated holographically for apodization.

6. (Original) The method of claim 1, further comprising the step of adding a sample to a working fluid, wherein the working fluid, including the sample, is introduced to the at least one detection module.

7. (Original) The method of claim 6, further comprising the step of recirculating the working fluid to obtain a second sample from the environment.

8. (Original) The method of claim 1, wherein measuring the optical property of the first filter and the second filter includes determining a change in refractive index of the first filter and second filter.

9. (Original) The method of claim 1, further comprising the step of storing data of the measured properties of the first filter and the measured properties of the second filter indicative of the presence of the target agent.

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10. (Currently amended) A sensor for determining the presence of at least one target agent in a sample comprising:

a collector system for collecting the sample from an environment;

a transfer system for adding the sample to a working fluid;

a dispenser system for introducing the working fluid, including the sample, to a detector system; and

a detector system comprising at least one detector module that includes:

at least a first optical grating, [[and]] a second optical grating, and a third optical grating, wherein the first optical grating, [[and]] the second optical grating, and third optical grating are porous Bragg gratings, further wherein the first optical grating contains at least one detector molecule for binding the at least one target agent thereto and the second optical grating does not contain a detector molecule for binding the at least one target agent thereto, the third optical grating being isolated and not in contact with the working fluid;

at least a first measuring device for measuring an optical response of the first optical grating after contact with the working fluid, including the sample,

at least a second measuring device for measuring an optical response of the second optical grating after contact with the working fluid, including the sample,

at least a third measuring device for measuring an optical response of the third optical grating, and

a processor for comparing the measured optical response from the at least a first measuring device to the measured optical response from the at least a second measuring device to determine [[the]] a presence of the at least one target agent, for comparing the measured optical response from the third filter to the measured optical response from the first and second filters to determine a presence of spurious signals caused by surroundings of the sensor.

11. (Original) The sensor according to claim 10 further comprising a data storage system for storing data indicative of the presence of the at least one target agent.

12. (Original) The sensor according to claim 11 further comprising a transmission system for transmitting the data indicative of the presence of the at least one target agent to an analysis location.

13. (Original) The sensor according to claim 10 further comprising a recirculation system for receiving the working fluid, including the sample, from the at least one detector module and removing the sample therefrom in order to re-use the working fluid with another sample from the collector system.

14. (Cancelled)

15. (Previously presented) The sensor of claim 10, wherein the Bragg gratings are formed of a holographically polymerized polymer-dispersed liquid crystal material.

16. (Original) The sensor of claim 15, wherein the polymer-dispersed liquid crystal material comprises, prior to holographic polymerization:

(a) a polymerizable monomer;
(b) a liquid crystal;
(c) a cross-linking monomer;
(d) a coinitiator;
(e) a photoinitiator dye; and
(f) a binding site monomer.

17. (Original) The sensor of claim 10, wherein the at least a first measuring device and the at least a second measuring device are photodetectors.

18. (Original) The sensor of claim 10, wherein the at least one detector module further comprises:

a first inlet reservoir integrally connected to a first micro-fluidic channel for providing the working fluid, including the sample, to the at least a first optical grating; and

a second inlet reservoir integrally connected to a second micro-fluidic channel for providing the working fluid, including the sample, to the at least a second optical grating.

19. (Original) The sensor of claim 18 further comprising a light source optically coupled to a waveguide for providing light to the at least a first optical grating and the at least a second optical grating.

20. (Currently amended) A detector module for detecting a target agent within a sample, the detector module comprising:

a first and second inlet reservoir for receiving a working fluid containing the sample therein;

a first micro-fluidic channel integrally connected to the first inlet reservoir;

a second micro-fluidic channel integrally connected to the second inlet reservoir;

a first optical grating physically integrated with the first micro-fluidic channel and a second optical grating physically integrated with the second micro-fluidic channel, wherein the first optical grating and the second optical grating [[are]]<u>comprise</u> porous Bragg gratings, further wherein the first optical grating includes at least one detector molecule for binding the target agent within the sample thereto and the second optical grating does not include a detector molecule for binding the target agent within the sample thereto;

<u>a third optical grating which is isolated from the working fluid, the third optical grating comprising a porous Bragg grating;</u> and

at least one outlet reservoir physically integrated with the first and second micro-fluidic channels for removing the working fluid containing the sample from the detector module in order to re-use the working fluid with another sample.

21. (Original) The detector module of claim 20 further comprising:

a substrate formed of a first material; and

a second material formed on at least part of the substrate, wherein the at least one inlet reservoir, the first micro-fluidic channel, the second micro-fluidic channel, the first optical grating, the second optical grating and the at least one outlet reservoir are formed in the second material.

22. (Original) The detector module of claim 21, wherein the first material is silicon.

23. (Original) The detector module of claim 21, wherein the second material is silicon dioxide.

24. (Original) The detector module of claim 21 further comprising a waveguide formed of a third material and optically integrated with the first and second optical gratings.

25. (Original) The detector module of claim 24, wherein the third material is silicon oxynitride.

26. (Original) The detector module of claim 24, wherein the waveguide is split into a first arm that is optically integrated with the at least a first optical grating and a second arm that is optically integrated with the second optical grating.

27. (Original) The detector module of claim 24 further comprising;

a light source optically coupled to the waveguide;

a first photodetector located in an optical path of the waveguide and an optical path of the first optical grating; and

a second photodetector located in the optical path of the waveguide and an optical path of the second optical grating.

28. (Currently Amended) The detector module of claim 26 further ~~comprising~~ <u>wherein the</u> [[a]] third optical grating <u>is</u> located in a third arm of the waveguide, wherein the third optical grating does not contact the sample.

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29. (Original) The detector module of claim 20, wherein the first and second optical gratings are formed of a holographically polymerized polymer-dispersed liquid crystal material comprising, prior to holographic polymerization:

(a) a polymerizable monomer;
(b) a liquid crystal;
(c) a cross-linking monomer;
(d) a coinitiator;
(e) a photoinitiator dye; and
(f) a binding site monomer.

30. (Original) The detector module of claim 20 further comprising:

a substrate formed of a first material;

a second material formed on at least part of the substrate having a waveguide formed therein of a third material; and

a fourth material formed on at least part of the second material wherein the at least one inlet reservoir, the first micro-fluidic channel, the second micro-fluidic channel, the first optical grating, the second optical grating and the at least one outlet reservoir are formed in the fourth material.

31. (Original) The detector module of claim 30, wherein the first material is silicon.

32. (Original) The detector module of claim 30, wherein the second material is SiO_2.

33. (Original) The detector module of claim 30, wherein the third material is silicon oxynitride.

34. (Original) The detector module of claim 30, wherein the fourth material is a polymer.

35. (Cancelled)

36. (Cancelled)

37. (Cancelled)

38. (Cancelled)

39. (New) The method of claim 1, wherein the spurious signals comprise fluctuations due to one of: thermal drift of from at least one of the filters and light source changes.

40. (New) The sensor according to claim 10, wherein the spurious signals comprise fluctuations due to one of: thermal drift of from at least one of the filters and light source changes.

41. (New) The detector module of claim 20, wherein the third optical grating is used to determine a presence of spurious signals caused by the environment.

42. (New) The detector module of claim 41, wherein the spurious signals comprise fluctuations due to one of: thermal drift of from at least one of the filters and light source changes.

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